Intermittent injecting drug use and HCV incidence in an observational cohort study of people who inject drugs in Montréal, Canada

Emmanuel Fortier1,2, Andreea Adelina Artenie2,3, Didier Jutras-Aswad2,4, Elise Roy5,6, Jason Grebely7, and Julie Bruneau1,2

1Department of Family and Emergency Medicine, Faculty of Medicine, Université de Montréal, Montréal, QC, Canada; 2CHUIM Research Center, Montréal, QC, Canada; 3Department of Social and Preventive Medicine, School of Public Health, Université de Montréal, Montréal, QC, Canada; 4Department of Psychiatry, Faculty of Medicine, Université de Montréal, Montréal, QC, Canada; 5Addiction Research and Study Program, Faculty of Medicine and Health Sciences, Université de Sherbrooke, Longueuil, QC, Canada; 6Institut national de santé publique du Québec, Montréal, QC, Canada; 7The Kirby Institute, UNSW Australia, Sydney, NSW, Australia.

Background

- In Montréal, hepatitis C virus (HCV) infection is highly problematic among people who inject drugs (PWID), with incidence estimates varying between 14 and 24 per 100 person-years between 1997 and 2014 [1, 2].
- Among the few studies describing longitudinal injecting drug use behavioral dynamics, 6-37% of PWID had an injecting drug use trajectory characterized by multiple episodes of injection cessation and relapse (i.e. intermittent injecting drug use) [3-5].
- "Temporary breaks" of injecting drug use were suggested as a way to reduce the likelihood of being exposed to HCV [6], although the evidence is scarce.
- Our previous work (unpublished results) has shown that compared to continuous injecting drug use, intermittent injecting drug use, defined as injecting within 1 or 2 months out of a 3-month period, was associated with:
  - A reduced risk of borrowing previously used injection material;
  - A reduced frequency of injecting drug use.
- Borrowing previously used injection material and frequent injecting drug use are prominent risk factors for HCV infection [6, 7].

Objective

Specific aim:
- To assess the association between HCV infection and intermittent injecting drug use, compared to continuous injecting drug use.

Hypothesis:
- Based on our previous work, intermittent injecting drug use will be associated with a reduced risk of HCV infection, compared to continuous injecting drug use.

Methods

Study design:
- Hepatitis Cohort study (HEPCO): ongoing observational cohort of active PWID based in Montréal, Canada.
- Inclusion criteria: age ≥18 years; Injecting drug use in the 6 months prior to enrollment; HCV RNA negative at baseline; assessment between March 2011 and December 2014; and ≥1 follow-up visit.
- Data collection: at baseline and 3-month follow-up visits; HCV testing and interviewer-administered questionnaire eliciting information on sociodemographics, drug use and related behaviors, and treatment utilization.

Variables of interest:
- Injecting drug use within the past 5 months: reported at each visit, and defined on a categorical scale: injecting within 0 (no use) 1 or 2 months (intermittent use), or 3 months (continuous use). See Figure 1.
- HCV infection: HCV RNA+ or seroconversion; estimated to occur at the midpoint between a negative and a positive consecutive visit; investigated among HCV Ab– participants (at-risk of primary infection) and HCV Ab+ participants (at-risk of reinfection or recurrence).

Statistical analyses:
- Cox regression analyses with time-dependent covariates: multivariate models adjusted for potential confounders identified a priori, including: age at baseline; gender; and opioid substitution treatment (OST) in the past 3 months. HCV Ab status at baseline assessed for effect modification. Performed using SAS, version 9.3.

Results

- 311 participants contributed 1,689 visits, resulting in 63 HCV infections (34 primary infections, 29 reinfections/reurrences).
- Baseline characteristics: mean age 40 years; 82% male; 47% HCV Ab+; 188 (60%), 79 (25%) and 44 (14%) participants reported continuous, intermittent and no injecting drug use in the past 3 months, respectively.
- HCV incidence: 11.3 per 100 person-years (95%CI 8.8-14.4).

Table 1. Univariate/multivariate Cox models of the association between HCV infection and injecting drug use patterns.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Injecting drug use in the past 3 months</th>
<th>HR (95%CI)</th>
<th>aHR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous use</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Intermittent use</td>
<td>0.36 (0.17-0.77)</td>
<td>0.40 (0.19-0.66)</td>
<td></td>
</tr>
<tr>
<td>No use</td>
<td>0.23 (0.09-0.58)</td>
<td>0.30 (0.12-0.77)</td>
<td></td>
</tr>
</tbody>
</table>

- Age at baseline
- Per 5 year increase
- Gender
- Male
- Female
- OST in the past 3 months
- No
- Yes
- Not eligible for OST

- Kaplan–Meier failure estimates for HCV infection stratified by injecting drug use patterns.

Conclusions

- Intermittent injecting drug use was associated with a reduced risk of getting infected with HCV, compared to continuous injecting drug use.
- The effect of intermittent injecting drug use on the risk of HCV infection was similar to the effect of no injecting drug use.
- Findings suggest that intermittent injecting drug use should be encouraged over continuous use by health care providers.
- At the clinical and public health levels, findings bring new perspectives for improving harm reduction interventions among PWID and preventing the transmission of HCV, and possibly hepatitis B and HIV.
- Further work is needed to contextualize intermittent injecting drug use among injecting drug use trajectories.

References


This work was supported by the Canadian Institutes of Health Research (CIHR) (MOP74921) and the Fonds de recherche du Québec – Santé (FRQS) (FRQSS2986). None of the authors has commercial relationships that might pose a conflict of interest in connection with this work. EF is supported through a CIHR MD/PhD scholarship and a Canadian Network on Hepatitis C (CanHepC) PhD trainee scholarship. AM is supported through a CIHR PhD scholarship (Frederick Benning and Charles Best Graduate Scholarship) and a CanHepC PhD trainee scholarship. DJA is supported through a FRQS Clinical Researcher Salary Award. ÉR holds the Chair in Addiction Research funded by the Université de Sherbrooke, the Hôpital Charles Lemoyne Foundation and the Université de Sherbrooke Foundation. JG is supported through an NHMRC Career Development Fellowship. JG is a consultant/advisor and has received research grants from AbbVie, Bristol Myers Squibb, Gilead and Merck.